

Test Report  
检测报告

No. C220106020003-1  
编号: C220106020003-1

Date: Jan 13, 2022  
日期: 2022年01月13日

Page 1 of 7  
第1页,共7页

Applicant:

申请公司:

Applicant address:

申请公司地址:

The following samples were submitted and identified on behalf of the clients as

以下测试之样品是由申请者所提供及确认

Sample Name 样品名称:	Li-MnO2 button cell 锂-二氧化锰纽扣电池
Model:/型号:	CR1220,CR1616,CR1620,CR1632,CR2016,CR2025,CR2032,CR2050, CR2430,CR2450,CR2477,CR3032,CR927
Manufacturer: 制造商:	
Manufactured Address: 制造商地址:	
Sample Quantity: 样品数量:	03 pcs 03 件
CPST Internal Reference No.: 编号:	C220106020 C220106020
Date of Sample Received: 收样日期:	Jan 06, 2022 2022年01月06日
Testing Period: 测试周期:	Jan 06, 2022 to Jan 13, 2022 2022年01月06日至2022年01月13日



Signed for and on behalf of  
Euronos (Dongguan) Consumer Products Testing Service Co., Ltd

WRITTEN BY :

Silvia Chan

陈晓婷, Silvia  
报告编写员

REVIEWED BY:

Sunshine Liu

刘小芳, Sunshine  
报告审核员

APPROVED BY:

Will Pan

潘坚定, Will  
技术总监

**Note:** This Test report shall be invalid if it is not stamped with the special seal for testing. Only responsible for the tested samples, invalid if rewritten, added and deleted. This test report cannot be reproduced, except in full, without prior written permission of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law. Any demurral to the content of test report, please propose in 15 days after the report's sending out, it will not be accepted after this date.

**说明:** 报告未盖本机构“检测专用章”无效。报告只对委托之样品负责。报告涂改、自行增删无效。未经本机构批准,不得复制(全文复制除外)本报告。未经授权对本报告的内容或外观进行任何更改、伪造或篡改均属于违法行为,违者将受到法律起诉。如果客户对本报告有异议,请于报告发出之日起15日内提出,逾期不予受理。

 400 111 6218

Euronos (Dongguan) Consumer Products Testing Service Co., Ltd  
东莞市欧冠检测技术服务有限公司 电话 Tel: (86-769) 38937858 传真 Fax: (86-769) 38937859 网址 Http:// www.cpstlab.com  
Room 1092, No.12, East of Houjie Avenue, Houjie, Dongguan, Guangdong, China  
中国·广东·东莞·厚街镇厚街大道东12号1092室 邮编 Postcode: 523945 邮箱 E-mail: service@cpstlab.com

Test Report  
检测报告

No. C220106020003-1  
编号: C220106020003-1

Date: Jan 13, 2022  
日期: 2022年01月13日

Page 2 of 7  
第2页,共7页

\*\*\*\*\*

CONCLUSION:

结论:

TESTED SAMPLES

测试样品

Li-MnO<sub>2</sub> button cell  
锂-二氧化锰纽扣电池

TEST ITEM

测试项目

1. Lead, Cadmium & Mercury content - Directive 2006/66/EC and its amendment 2013/56/EU  
1. 铅, 镉和汞的含量 - 欧洲电池指令2006/66/EC及其修订指令2013/56/EU

RESULT

结果

**PASS**  
**合格**

\*\*\*\*\*

**Note:** This Test report shall be invalid if it is not stamped with the special seal for testing. Only responsible for the tested samples, invalid if rewritten, added and deleted. This test report cannot be reproduced, except in full, without prior written permission of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law. Any demurral to the content of test report, please propose in 15 days after the report's sending out, it will not be accepted after this date.

**说明:** 报告未盖本机构“检测专用章”无效。报告只对委托之样品负责。报告涂改、自行增删无效。未经本机构批准,不得复制(全文复制除外)本报告。未经授权对本报告的内容或外观进行任何更改、伪造或篡改均属于违法行为,违者将受到法律起诉。如果客户对本报告有异议,请于报告发出之日起15日内提出,逾期不予受理。



400 111 6218

Eurones (Dongguan) Consumer Products Testing Service Co., Ltd

东莞市欧冠检测技术有限公司

电话 Tel: (86-769) 38937858 传真 Fax: (86-769) 38937859

网址 Http:// www.cpstlab.com

Room 1092, No.12, East of Houjie Avenue, Houjie, Dongguan, Guangdong, China

中国·广东·东莞·厚街镇厚街大道东12号1092室

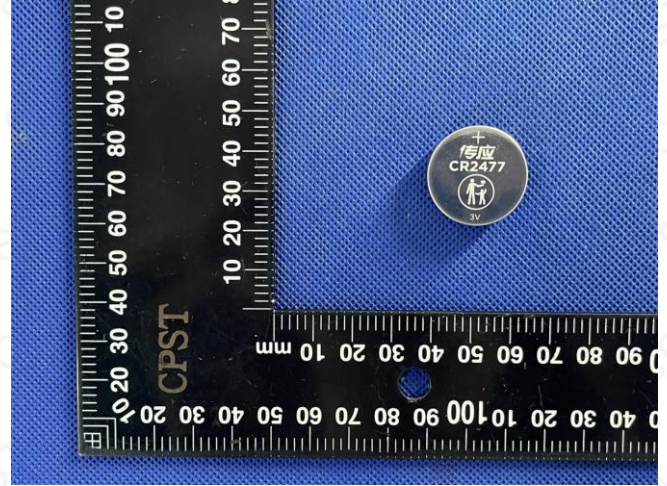
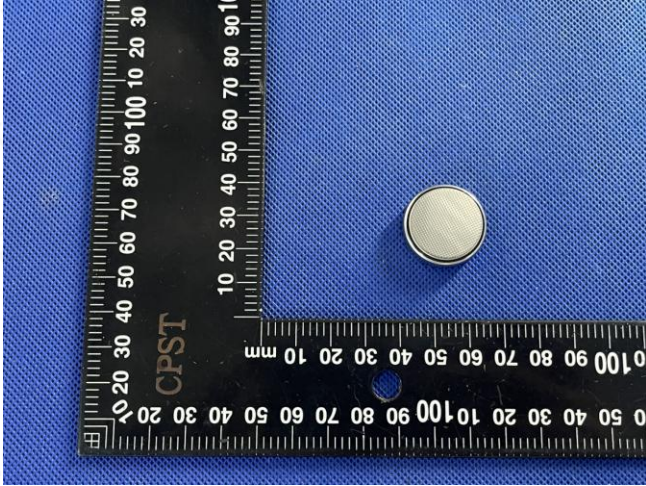
邮编 Postcode: 523945

邮箱 E-mail: service@cpstlab.com



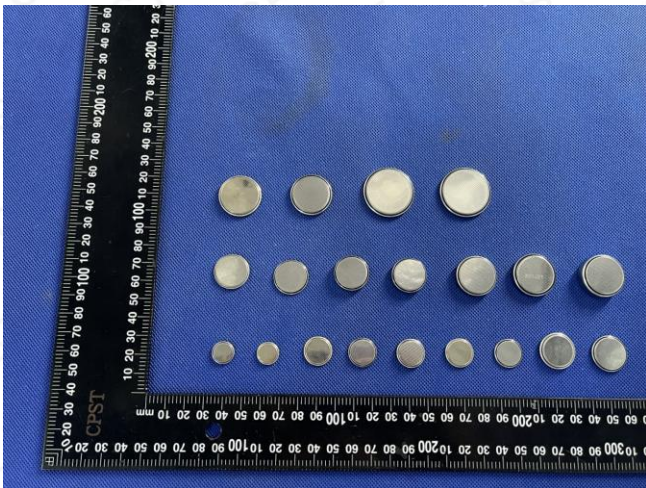
**Photo of the Submitted Sample**

送检样品照片



Test sample

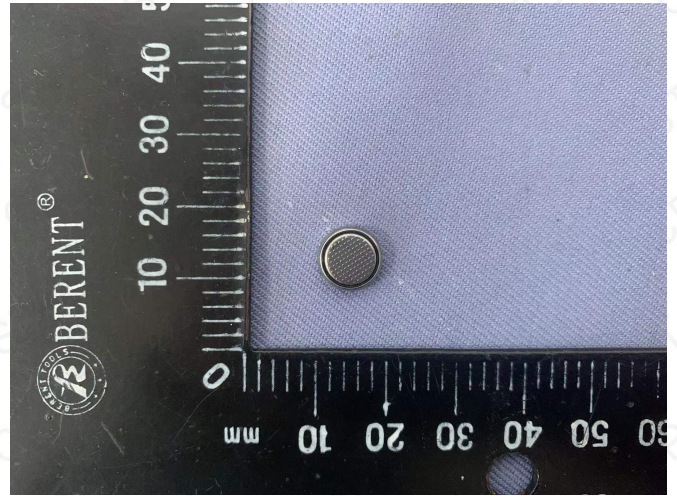
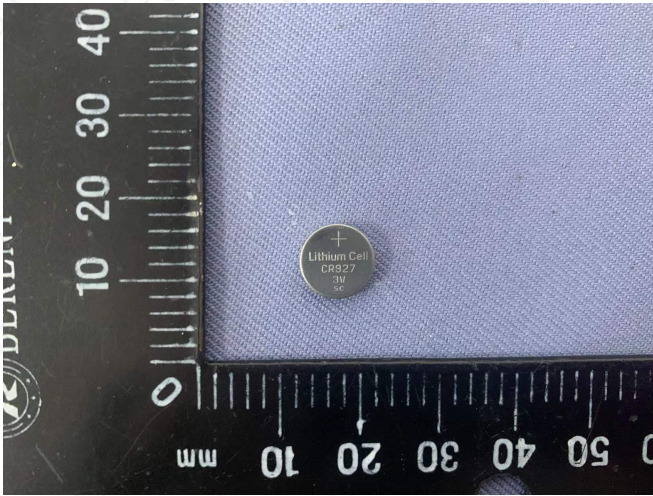
测试样品



**Note:** This Test report shall be invalid if it is not stamped with the special seal for testing. Only responsible for the tested samples, invalid if rewritten, added and deleted. This test report cannot be reproduced, except in full, without prior written permission of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law. Any demurral to the content of test report, please propose in 15 days after the report's sending out, it will not be accepted after this date.

**说明:** 报告未盖本机构“检测专用章”无效。报告只对委托之样品负责。报告涂改、自行增删无效。未经本机构批准,不得复制(全文复制除外)本报告。未经授权对本报告的内容或外观进行任何更改、伪造或篡改均属于违法行为,违者将受到法律起诉。如果客户对本报告有异议,请于报告发出之日起15日内提出,逾期不予受理。





**Note:** This Test report shall be invalid if it is not stamped with the special seal for testing. Only responsible for the tested samples, invalid if rewritten, added and deleted. This test report cannot be reproduced, except in full, without prior written permission of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law. Any demurral to the content of test report, please propose in 15 days after the report's sending out, it will not be accepted after this date.

**说明:** 报告未盖本机构“检测专用章”无效。报告只对委托之样品负责。报告涂改、自行增删无效。未经本机构批准,不得复制(全文复制除外)本报告。未经授权对本报告的内容或外观进行任何更改、伪造或篡改均属于违法行为,违者将受到法律起诉。如果客户对本报告有异议,请于报告发出之日起15日内提出,逾期不予受理。



400 111 6218

Eurones (Dongguan) Consumer Products Testing Service Co., Ltd

东莞市欧冠检测技术服务有限公司

电话 Tel: (86-769) 38937858

传真 Fax: (86-769) 38937859

网址 Http:// www.cpstlab.com

Room 1092, No.12, East of Houjie Avenue, Houjie, Dongguan, Guangdong, China

中国·广东·东莞·厚街镇厚街大道东12号1092室

邮编 Postcode: 523945

邮箱 E-mail: service@cpstlab.com

**Test Result(s):**

**测试结果:**

Description of Specimen:

Li-MnO<sub>2</sub> button cell

样品描述:

锂-二氧化锰纽扣电池

**1. Lead, Cadmium & Mercury content—Directive 2006/66/EC and its amendment 2013/56/EU**

**1. 铅、镉和汞的含量 - 欧洲电池指令2006/66/EC及其修订指令2013/56/EU**

Test Method: With reference to US EPA 3052:1996, analysis was performed by ICP-OES.

测试方法: 参考US EPA 3052:1996, 采用电感耦合等离子体发射光谱仪 (ICP-OES) 分析。

Test Items 测试项目	Unit	Result 结果	MDL	Limit 限值
Lead (Pb) 铅 (Pb)	%	N.D.	0.0002	0.004
Mercury (Hg) 汞 (Hg)	%	N.D.	0.0002	Battery /accumulators:0.0005 电池/蓄电池:0.0005
Cadmium(Cd) 镉(Cd)	%	N.D.	0.0002	Portable Battery /accumulators:0.002 便携式电池/蓄电池:0.002

**Note:**

**注释:**

1. % = percentage by weight.  
1. % = 重量百分比。
2. 0.0001% = 1 mg/kg.  
2. 0.0001% = 1 mg/kg。
3. MDL = Method Detection Limit.  
3. MDL = 方法检出限。
4. N.D. = Not Detected (< MDL).  
4. N.D. = 未检出(< MDL)。
5. According to the 2006/66/EC directive, the symbol indicating the heavy-metal content shall consist of the chemical symbol for the metal concerned, Hg content more than 0.0005%, Cd content more than 0.002% or Pb content more than 0.004% according to the type of battery or accumulator concerned.  
5. 根据欧盟 2006/66/EC 指令, 凡是含汞超过 0.0005%、镉超过 0.002%或铅超过 0.004%的电池、蓄电池和纽扣电池均也应贴上相关金属的化学符号: Hg、Cd 或 Pb 等。

**Note:** This Test report shall be invalid if it is not stamped with the special seal for testing. Only responsible for the tested samples, invalid if rewritten, added and deleted. This test report cannot be reproduced, except in full, without prior written permission of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law. Any demurral to the content of test report, please propose in 15 days after the report's sending out, it will not be accepted after this date.

**说明:** 报告未盖本机构“检测专用章”无效。报告只对委托之样品负责。报告涂改、自行增删无效。未经本机构批准,不得复制(全文复制除外)本报告。未经授权对本报告的内容或外观进行任何更改、伪造或篡改均属于违法行为,违者将受到法律起诉。如果客户对本报告有异议,请于报告发出之日起 15 日内提出,逾期不予受理。



400 111 6218

Eurones (Dongguan) Consumer Products Testing Service Co., Ltd

东莞市欧冠检测技术服务有限公司

电话 Tel: (86-769) 38937858

传真 Fax: (86-769) 38937859

网址 Http:// www.cpstlab.com

Room 1092, No.12, East of Houjie Avenue, Houjie, Dongguan, Guangdong, China

中国·广东·东莞·厚街镇厚街大道东12号1092室

邮编 Postcode: 523945

邮箱 E-mail: service@cpstlab.com



Button battery:  
纽扣电池中:

Calculate the Mercury in the whole battery:  
整个电池中汞的含量:

Test Method: With reference to US EPA 3052:1996, analysis was performed by ICP-OES.

测试方法: 参考 US EPA 3052:1996, 采用电感耦合等离子体发射光谱仪 (ICP-OES) 分析。

Test Items 测试项目	Unit 单位	Result 结果	MDL	Limit* 限值*
Mercury (Hg) 总汞 (Hg)	mg/kg	N.D.	1.0	5

Note:

1. mg/kg = milligram per kilogram = ppm
2. MDL = Method Detection Limit.
3. N.D. = Not Detected (< MDL).
4. \*This is applicable for Button battery.

注释:

1. mg/kg = 毫克每千克 = ppm
2. MDL = 方法检出限
3. N.D. = 未检出 (< MDL)
4. \*适用于纽扣电池

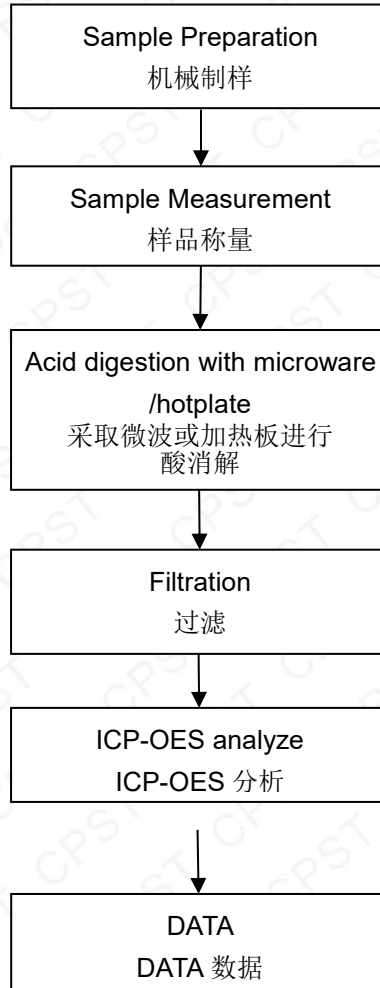
Remark: As specified by applicant, to test content in the selected materials of the submitted samples. The test results are only responsible for the submitted sample.

备注: 根据申请人的要求, 对提交样品所选的材料进行检测。测试结果仅对提交的样品负责。

**Note:** This Test report shall be invalid if it is not stamped with the special seal for testing. Only responsible for the tested samples, invalid if rewritten, added and deleted. This test report cannot be reproduced, except in full, without prior written permission of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law. Any demurral to the content of test report, please propose in 15 days after the report's sending out, it will not be accepted after this date.

**说明:** 报告未盖本机构“检测专用章”无效。报告只对委托之样品负责。报告涂改、自行增删无效。未经本机构批准, 不得复制(全文复制除外)本报告。未经授权对本报告的内容或外观进行任何更改、伪造或篡改均属于违法行为, 违者将受到法律起诉。如果客户对本报告有异议, 请于报告发出之日起 15 日内提出, 逾期不予受理。

## Lead, Cadmium & Mercury Testing Flow Chart 铅, 镉和汞 测试流程图



\*\*\* End of Report \*\*\*

\*\*\* 报告结束 \*\*\*

**Note:** This Test report shall be invalid if it is not stamped with the special seal for testing. Only responsible for the tested samples, invalid if rewritten, added and deleted. This test report cannot be reproduced, except in full, without prior written permission of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law. Any demurral to the content of test report, please propose in 15 days after the report's sending out, it will not be accepted after this date.

**说明:** 报告未盖本机构“检测专用章”无效。报告只对委托之样品负责。报告涂改、自行增删无效。未经本机构批准,不得复制(全文复制除外)本报告。未经授权对本报告的内容或外观进行任何更改、伪造或篡改均属于违法行为,违者将受到法律起诉。如果客户对本报告有异议,请于报告发出之日起15日内提出,逾期不予受理。



400 111 6218

Eurones (Dongguan) Consumer Products Testing Service Co., Ltd

东莞市欧冠检测技术服务有限公司

电话 Tel: (86-769) 38937858

传真 Fax: (86-769) 38937859

网址 Http:// www.cpstlab.com

Room 1092, No.12, East of Houjie Avenue, Houjie, Dongguan, Guangdong, China

中国·广东·东莞·厚街镇厚街大道东12号1092室

邮编 Postcode: 523945

邮箱 E-mail: service@cpstlab.com



Test Report issued under the responsibility of:



**TEST REPORT  
IEC 60086-4  
Primary batteries  
Part 4: Safety of lithium batteries**

**Report Number**..... : CN21ZKQ4 001

**Date of issue**..... : 2021-07-01

**Total number of pages** ..... : 21 pages

**Name of Testing Laboratory  
preparing the Report** ..... : TÜV Rheinland (Shenzhen) Co., Ltd.

**Applicant's name** ..... :

**Address**..... :

**Test specification:**

**Standard** ..... : IEC 60086-4: 2019

**Test procedure** ..... : CB Scheme

**Non-standard test method** ..... : N/A

**Test Report Form No.** ..... : IEC60086\_4C

**Test Report Form(s) Originator** .... : DEKRA

**Master TRF** ..... : Dated 2019-06-19

**Copyright © 2019 IEC System of Conformity Assessment Schemes for Electrotechnical  
Equipment and Components (IECEE System). All rights reserved.**

This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

**This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory  
and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.**

**General disclaimer:**

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.



<b>Test item description</b> ..... :	Lithium Manganese Battery	
<b>Trade Mark</b> ..... :		
<b>Manufacturer</b> .....	Same as applicant	
<b>Model/Type reference</b> .....	CR2032	
<b>Ratings</b> .....	3V	
<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>		
<input checked="" type="checkbox"/>	<b>CB Testing Laboratory:</b>	<b>TÜV Rheinland (Shenzhen) Co., Ltd.</b>
<b>Testing location/ address</b> ..... :	1F East & 3F West -4F, Cybio Technology Building No.1, No.16 Kejibei 2nd Road, High-Tech Industrial Park North Nanshan District, 518057, Shenzhen, China	
<b>Tested by (name, function, signature)</b> ..... :	Joe Wang (Engineer)	<i>Joe Wang</i>
<b>Approved by (name, function, signature)</b> ... :	Caroline Chen (Reviewer)	<i>Caroline Chen</i>
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 1:</b>	
<b>Testing location/ address</b> ..... :		
<b>Tested by (name, function, signature)</b> ..... :		
<b>Approved by (name, function, signature)</b> ... :		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 2:</b>	
<b>Testing location/ address</b> ..... :		
<b>Tested by (name + signature)</b> .....		
<b>Witnessed by (name, function, signature) . :</b>		
<b>Approved by (name, function, signature)</b> ... :		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 3:</b>	
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 4:</b>	
<b>Testing location/ address</b> ..... :		
<b>Tested by (name, function, signature)</b> ..... :		
<b>Witnessed by (name, function, signature) . :</b>		
<b>Approved by (name, function, signature)</b> ... :		
<b>Supervised by (name, function, signature) :</b>		

<b>List of Attachments (including a total number of pages in each attachment):</b> Attachment 1: Photo Documentation (3 pages)	
<b>Summary of testing:</b>	
<b>Tests performed (name of test and test clause):</b> 6.4.1 Test A: Altitude 6.4.2 Test B: Thermal cycling 6.4.3 Test C: Vibration 6.4.4 Test D: Shock 6.5.1 Test E: External short-circuit 6.5.3 Test G: Crush 6.5.4 Test H: Forced discharge 6.5.5 Test I: Abnormal charging 6.5.6 Test J: Free fall 6.5.7 Test K: Thermal abuse 7.2 Safety precautions (Ingestion gauge) Annex E Child resistant packaging of coin cells	<b>Testing location:</b> <b>TÜV Rheinland (Shenzhen) Co., Ltd.</b> 1F East & 3F West -4F, Cybio Technology Building No.1, No.16 Kejjibei 2nd Road, High-Tech Industrial Park North Nanshan District, 518057, Shenzhen, China
<b>Summary of compliance with National Differences (List of countries addressed):</b>  N/A  <input checked="" type="checkbox"/> <b>The product fulfils the requirement of <u>EN60086-4: 2019</u></b>	

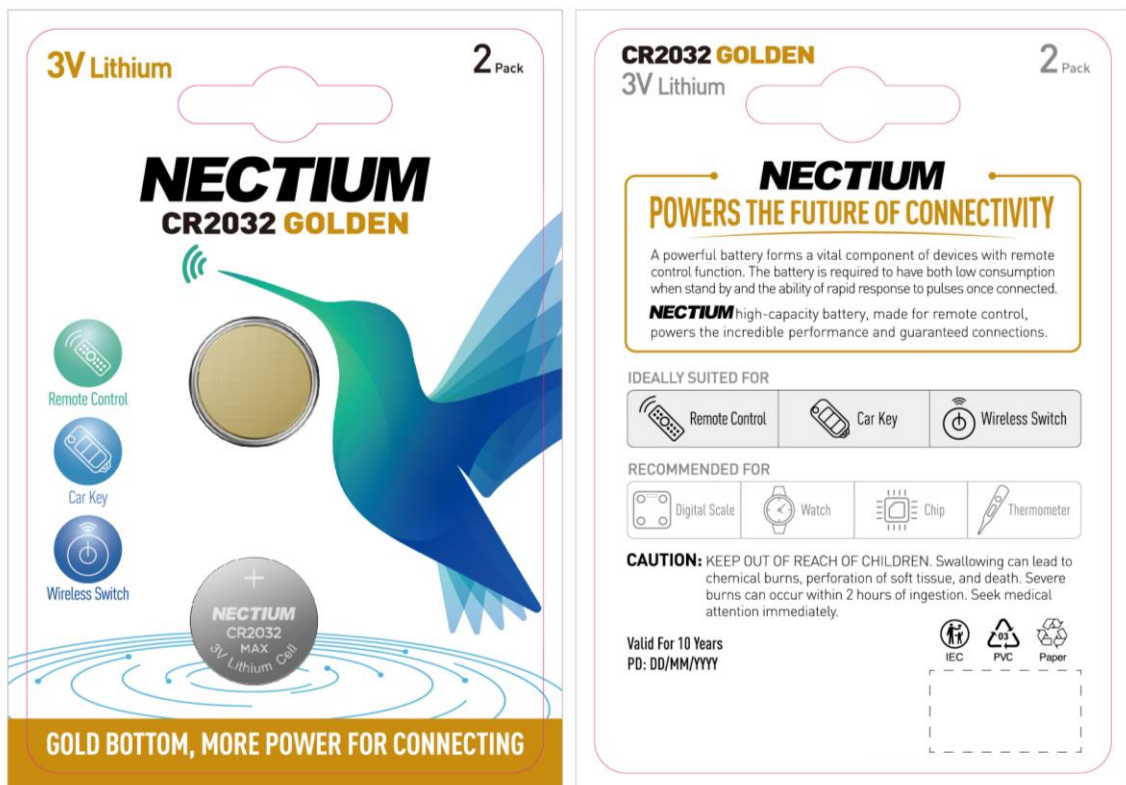


**Copy of marking plate:**

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



Battery marking



Immediate package marking

Remark:

DD/MM/YYYY represent manufacture date, DD is date, MM is month, YYYY is year.

Trademark **传应** and **NECTIUM** are both belong to applicant.

<b>Test item particulars</b> .....:	
<b>Classification of installation and use</b> .....: To be defined in final product	
<b>Supply Connection</b> .....: DC connector	
<b>Weight of Battery</b> .....: Approx. 3.0g	
<b>Possible test case verdicts:</b>	
- test case does not apply to the test object.....: N/A	
- test object does meet the requirement.....: P (Pass)	
- test object does not meet the requirement.....: F (Fail)	
<b>Testing</b> .....:	
<b>Date of receipt of test item</b> .....: 2021-06-01	
<b>Date (s) of performance of tests</b> .....: 2021-06-02 to 2021-06-28	
<b>General remarks:</b>	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC60086-2:</b>	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided .....	<input type="checkbox"/> <b>Yes</b> <input checked="" type="checkbox"/> <b>Not applicable</b>
<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies)</b> .....	

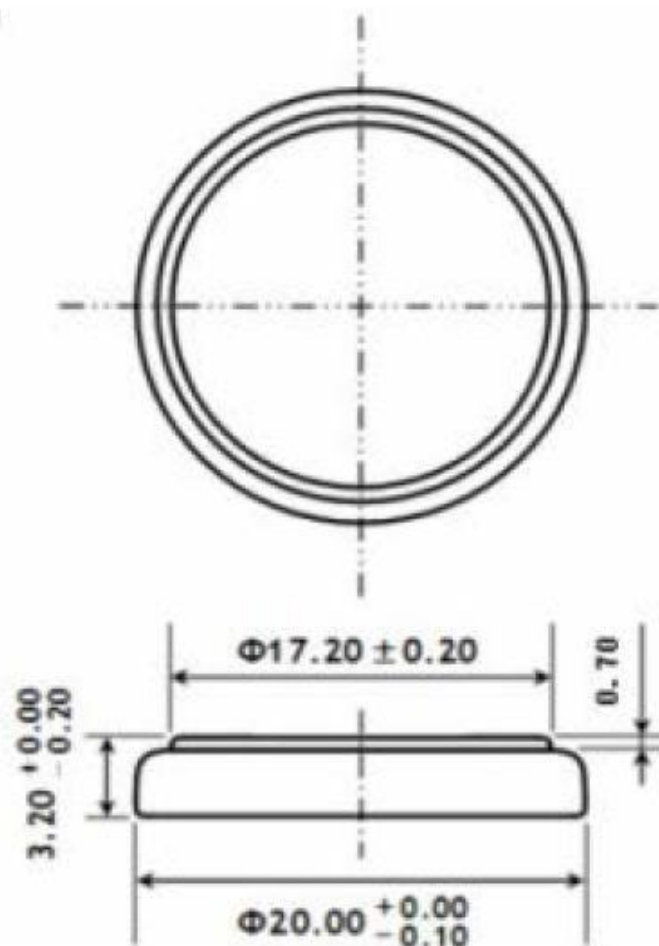


**General product information and other remarks:**

This product is a battery with single primary lithium cell, and has no over-discharge, overcurrent and short-circuits proof circuit.

The main features of the battery are shown as below:

Model	Nominal capacity	Nominal voltage	Maximum discharge current	Discharge cut-off voltage	Abnormal charging current	Dimensions
CR2032	240mAh	3.0V	10mA	2.0V	3mA	Diameter * Height: Max 20.0mm * Max 3.20mm

**Construction:**


Cell (Unit:mm)

**Circuit diagram:**

None, without any circuit.

IEC 60086-4			
Clause	Requirement + Test	Result - Remark	Verdict

<b>4</b>	<b>REQUIREMENTS FOR SAFETY</b>		P
<b>4.1</b>	<b>Design</b>		P
	a) Abnormal temperature rise above the critical value prevented		P
	b) Temperature increases in the battery controlled		P
	c) Lithium cells and batteries designed to relieve excessive internal pressure or to preclude a violent rupture under conditions of transport, intended use and reasonably foreseeable misuse	Venting mechanism exists.	P
<b>4.2</b>	<b>Quality plan</b>		P
	Manufacturer prepared and implemented a quality plan defining the procedures for the inspection of materials, components, cells and batteries during the course of manufacture, to be applied to the total process of producing a specific type of battery	ISO 9001: 2015 certificate provided.	P
	Manufactures understood their process capabilities and instituted the necessary process controls as they relate to product safety		P
<b>5</b>	<b>TYPE TESTING AND SAMPLING</b>		P
<b>5.1</b>	<b>Validity of testing</b>		P
<b>5.2</b>	<b>Test samples</b>	(See table 1 in the standard)	P
<b>6</b>	<b>TESTING AND REQUIREMENTS</b>		P
<b>6.1</b>	<b>General</b>		P
6.1.1	Test application matrix	(See table 2 in the standard)	P
	s: cell or single cell battery .....	Single cell battery	P
	m: multi cell battery .....		N/A
6.1.3	Ambient temperature (°C) .....	20±5	P
6.1.4	Parameter measurement tolerances		P
6.1.5	Predischarge	Predischarged samples provided by manufacturer	P
6.1.6	Additional cells		P
<b>6.2</b>	<b>Evaluation of test criteria</b>		P
6.2.1	Short-circuit		P
6.2.2	Excessive temperature rise		P
6.2.3	Leakage		P
6.2.4	Venting		P
6.2.5	Fire		P
6.2.6	Rupture		P
6.2.7	Explosion		P



IEC 60086-4			
Clause	Requirement + Test	Result - Remark	Verdict
<b>6.3</b>	<b>Tests and requirements – Overview</b>	(See table 4 in the standard)	P
<b>6.4</b>	<b>Tests for intended use</b>		P
6.4.1	Test A: Altitude .....	(See appended table 1)	P
6.4.2	Test B: Thermal cycling .....	(See appended table 1)	P
6.4.3	Test C: Vibration .....	(See appended table 1)	P
6.4.4	Test D: Shock .....	(See appended table 1)	P
<b>6.5</b>	<b>Tests for reasonably foreseeable misuse</b>		P
6.5.1	Test E: External short-circuit .....	(See appended table 1)	P
6.5.2	Test F: Impact .....	(See appended table 1)	N/A
6.5.3	Test G: Crush .....	(See appended table 1)	P
6.5.4	Test H: Forced discharge .....	(See appended table 1)	P
6.5.5	Test I: Abnormal charging .....	(See appended table 1)	P
6.5.6	Test J: Free fall .....	(See appended table 1)	P
6.5.7	Test K: Thermal abuse .....	(See appended table 1)	P
6.5.8	Test L: Incorrect installation .....		N/A
6.5.9	Test M: Overdischarge .....		N/A
<b>6.6</b>	<b>Information given in the relevant specification</b>		P
	a) Predischarge current or resistive load and end-point voltage specified by the manufacturer.....	15KΩ, 2.0V	P
	b) Method to measure the energy of an explosion, if any .....		N/A
	c) Shape: prismatic, flexible, coin or cylindrical Diameter: less than 18 mm or not less than 18 mm .....	Coin cell. Diameter: not less than 18mm.	P
	d) Maximum continuous discharge current specified by the manufacturer for test H.....	10mA as specified by manufacturer applied.	P
	e) Rated capacity specified by the manufacturer for test H.....	240mAh.	P
	f) Abnormal charging current declared by the manufacturer for test I .....	3mA as specified by manufacturer applied.	P
	g) Normal reverse current declared by the manufacturer which applied to the battery during its operating life.....	Not applicable declared by manufacturer, reverse current is not allowed for the battery.	N/A
<b>7</b>	<b>INFORMATION FOR SAFETY</b>		P
<b>7.1</b>	<b>Safety precautions during design of equipment</b>		P
7.1.1	General		P
7.1.2	Charge protection		P
7.1.3	Parallel connection		P
<b>7.2</b>	<b>Precautions during handling of batteries</b>		P

IEC 60086-4			
Clause	Requirement + Test	Result - Remark	Verdict
<b>7.3</b>	<b>Packaging</b>		P
<b>7.4</b>	<b>Handling of battery cartons</b>		P
<b>7.5</b>	<b>Transport</b>	Complied. UN 38.3 test report and certificate for safe transport provided. CVC No.: RZUN2020-1569	P
7.5.1	General		P
7.5.2	Air transport		P
7.5.3	Sea transport		P
7.5.4	Land transport		P
<b>7.6</b>	<b>Display and storage</b>		P
<b>7.7</b>	<b>Disposal</b>		P
<b>8</b>	<b>INSTRUCTIONS FOR USE</b>		P
<b>9</b>	<b>MARKING AND PACKAGING</b>		P
<b>9.1</b>	<b>General</b>		P
<b>9.2</b>	<b>Swallowable batteries</b>	Small cells.	P
<b>9.3</b>	<b>Safety pictograms</b>	Safety pictograms and cautionary advice marked on immediate package	P
<b>ANNEX A</b>	<b>(INFORMATIVE) GUIDELINES FOR THE ACHIEVEMENT OF SAFETY OF LITHIUM BATTERIES</b>		N/A
<b>ANNEX B</b>	<b>(INFORMATIVE) GUIDELINES FOR DESIGNERS OF EQUIPMENT USING LITHIUM BATTERIES</b>		N/A
<b>ANNEX C</b>	<b>(INFORMATIVE) ADDITIONAL INFORMATION ON DISPLAY AND STORAGE</b>		N/A
<b>ANNEX D</b>	<b>(INFORMATIVE) SAFETY PICTOGRAMS</b>		N/A
<b>D.1</b>	<b>General</b>		N/A
<b>D.2</b>	<b>Pictograms</b>		N/A
<b>D.3</b>	<b>Instruction for use</b>		N/A
<b>ANNEX E</b>	<b>(NORMATIVE) CHILD RESISTANT PACKAGING OF COIN CELLS</b>	Coin cell that diameter greater than 16mm	P
<b>E.1</b>	<b>General</b>		P
<b>E.2</b>	<b>Applicability</b>		P
<b>E.3</b>	<b>Packaging tests</b>		P
E.3.1	General		P
E.3.2	Test items		P
E.3.3	Test procedure		P
E.3.4	Criteria		P

IEC 60086-4			
Clause	Requirement + Test	Result - Remark	Verdict
<b>ANNEX F</b>	<b>(INFORMATIVE) USE OF THE KEEP OUT OF REACH OF CHILDREN SAFETY SIGN</b>	The sign marked on battery surface, see page 4.	P
<b>F.1</b>	<b>General</b>		P
<b>F.2</b>	<b>Safety sign</b>		P
<b>F.3</b>	<b>Best practices for marking the packaging</b>		P
<b>F.4</b>	<b>Best practices for marking the cell</b>		P

IEC 60086-4			
Clause	Requirement + Test	Result - Remark	Verdict

<b>TABLE: Critical components information</b>					
Object / part No.	Manufacturer / trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1)</sup>
Cell		CR2032	3V	IEC 60086-4: 2019	Tested with appliance
-Positive electrode	Xiangtan Manganese Industry Co., Ltd	Electrolytic manganese dioxide	Thickness: 1.05mm, Diameter: 9.35mm, EMD, Carbon Black, PTFE, Conductive Additive, MnO <sub>2</sub>	--	--
-Negative electrode	China Energy Lithium Co., Ltd	Lithium Ribbon	Thickness: 0.35mm, Diameter: 9.2mm, lithium (71.5mg)	--	--
-Separator	Shanghai Shilong Technology Co., Ltd	Y-14T	Thickness: 0.12mm, Diameter: 10.0mm, Polypropylene, Shutdown temperature: 130°C	--	--
-Electrolyte	Shenzhen CAPCHEM Technology Co., Ltd	PLB18388	Conductivity: 12±1mS/cm, LiClO <sub>4</sub> +DME+DOL+PC	--	--
-Shell	Zhuzhou Youngsun Battery Material Company	Steel 430	Thickness: 0.2mm, Surface treatment: Nickel plating	--	--
Supplementary information: <sup>1)</sup> Provided evidence ensures the agreed level of compliance. See OD-CB2039.					



IEC 60086-4			
Clause	Requirement + Test	Result - Remark	Verdict

<b>TABLE 1 (clause 6.4.1 – 6.5.9)</b>					
Tests	Cell / battery type	Discharge state	Number of test sample	Test result	Verdict
A to E	Cells and single cell batteries	Undischarged	10	NL, NV, NC, NR, NE, NF (for test A to D); NT, NR, NE, NF (for test E)	P
		Fully discharged	10	NL, NV, NC, NR, NE, NF (for test A to D); NT, NR, NE, NF (for test E)	P
	Multi-cell batteries	Undischarged	4		N/A
		Fully discharged	4		N/A
F	Cells and single cell batteries	Undischarged	5		N/A
		Fully discharged	5		N/A
	Multi-cell batteries	Undischarged	5 component cells		N/A
		Fully discharged	5 component cells		N/A
G	Cells and single cell batteries	Undischarged	5	NT, NE, NF	P
		Fully discharged	5	NT, NE, NF	P
	Multi-cell batteries	Undischarged	5 component cells		N/A
		Fully discharged	5 component cells		N/A
H	Cells and single cell batteries	Fully discharged	10	NE, NF	P
	Multi-cell batteries	Fully discharged	10 component cells		N/A
I to K	Cells and single cell batteries	Undischarged	5	NV, NE, NF (for test J); NE, NF (for test I & K)	P
	Multi-cell batteries	Undischarged	5		N/A
L	Cells and single cell batteries	Undischarged	20	NE, NF	N/A
M	Cells and single cell batteries	50 % predischarged	20	NE, NF	N/A
		75 % predischarged	20	NE, NF	N/A

Supplementary information:

NC: No short-circuit

NE: No explosion

NF: No fire

NL: No leakage

NR: No rupture

NT: No excessive temperature rise

NV: No venting

6.4.1	TABLE: Test A: Altitude (Undischarged)			P
Cell. No.	Before test		After test	
	cell voltage (V)	cell weight (g)	cell voltage (V)	cell weight (g)
#1	3.28	3.163	3.28	3.162
#2	3.30	3.174	3.30	3.172
#3	3.30	3.183	3.30	3.179
#4	3.28	3.176	3.28	3.175
#5	3.28	3.177	3.28	3.173
#6	3.30	3.201	3.30	3.198
#7	3.30	3.186	3.31	3.186
#8	3.30	3.194	3.30	3.192
#9	3.28	3.170	3.28	3.168
#10	3.29	3.181	3.29	3.180
<b>Supplementary information:</b> - No leakage, no venting, no short-circuit, no rupture, no explosion and no fire.				
6.4.1	TABLE: Test A: Altitude (Fully discharged)			P
Cell. No.	Before test		After test	
	cell voltage (V)	cell weight (g)	cell voltage (V)	cell weight (g)
#11	2.76	3.182	2.76	3.181
#12	2.88	3.202	2.88	3.201
#13	2.64	3.171	2.64	3.169
#14	2.78	3.193	2.78	3.189
#15	2.82	3.169	2.82	3.169
#16	2.71	3.180	2.71	3.178
#17	2.85	3.179	2.85	3.178
#18	2.91	3.180	2.91	3.180
#19	2.89	3.167	2.89	3.166
#20	2.57	3.113	2.57	3.112
<b>Supplementary information:</b> - No leakage, no venting, no short-circuit, no rupture, no explosion and no fire.				

6.4.2	TABLE: Test B: Thermal cycling (Undischarged)			P
Cell. No.	Before test		After test	
	cell voltage (V)	cell weight (g)	cell voltage (V)	cell weight (g)
#1	3.28	3.162	3.15	3.162
#2	3.30	3.172	3.13	3.169
#3	3.30	3.179	3.08	3.178
#4	3.28	3.175	3.07	3.174
#5	3.28	3.173	3.24	3.172
#6	3.30	3.198	3.22	3.198
#7	3.31	3.186	3.19	3.185
#8	3.30	3.192	3.05	3.192
#9	3.28	3.168	3.28	3.166
#10	3.29	3.180	3.21	3.180
<b>Supplementary information:</b> - No leakage, no venting, no short-circuit, no rupture, no explosion and no fire.				
6.4.2	TABLE: Test B: Thermal cycling (Fully discharged)			P
Cell. No.	Before test		After test	
	cell voltage (V)	cell weight (g)	cell voltage (V)	cell weight (g)
#11	2.76	3.181	2.84	3.180
#12	2.88	3.201	2.94	3.199
#13	2.64	3.169	2.71	3.169
#14	2.78	3.189	2.87	3.189
#15	2.82	3.169	2.91	3.168
#16	2.71	3.178	2.79	3.176
#17	2.85	3.178	2.93	3.178
#18	2.91	3.180	2.96	3.179
#19	2.89	3.166	2.95	3.166
#20	2.57	3.112	2.63	3.112
<b>Supplementary information:</b> - No leakage, no venting, no short-circuit, no rupture, no explosion and no fire.				

6.4.3	TABLE: Test C: Vibration (Undischarged)			P
Cell. No.	Before test		After test	
	cell voltage (V)	cell weight (g)	cell voltage (V)	cell weight (g)
#1	3.15	3.162	3.15	3.162
#2	3.13	3.169	3.13	3.169
#3	3.08	3.178	3.08	3.178
#4	3.07	3.174	3.07	3.174
#5	3.24	3.172	3.24	3.172
#6	3.22	3.198	3.23	3.198
#7	3.19	3.185	3.19	3.185
#8	3.05	3.192	3.05	3.192
#9	3.28	3.166	3.28	3.166
#10	3.21	3.180	3.22	3.180
<b>Supplementary information:</b> - No leakage, no venting, no short-circuit, no rupture, no explosion and no fire.				
6.4.3	TABLE: Test C: Vibration (Fully discharged)			P
Cell. No.	Before test		After test	
	cell voltage (V)	cell weight (g)	cell voltage (V)	cell weight (g)
#11	2.84	3.180	2.84	3.180
#12	2.94	3.199	2.95	3.198
#13	2.71	3.169	2.71	3.169
#14	2.87	3.189	2.87	3.189
#15	2.91	3.168	2.91	3.167
#16	2.79	3.176	2.79	3.176
#17	2.93	3.178	2.93	3.178
#18	2.96	3.179	2.96	3.178
#19	2.95	3.166	2.95	3.166
#20	2.63	3.112	2.63	3.112
<b>Supplementary information:</b> - No leakage, no venting, no short-circuit, no rupture, no explosion and no fire.				



6.4.4	TABLE: Test D: Shock (Undischarged)			P
Cell. No.	Before test		After test	
	cell voltage (V)	cell weight (g)	cell voltage (V)	cell weight (g)
#1	3.15	3.162	3.15	3.162
#2	3.13	3.169	3.13	3.169
#3	3.08	3.178	3.08	3.178
#4	3.07	3.174	3.07	3.174
#5	3.24	3.172	3.24	3.172
#6	3.23	3.198	3.23	3.198
#7	3.19	3.185	3.19	3.185
#8	3.05	3.192	3.05	3.192
#9	3.28	3.166	3.28	3.166
#10	3.22	3.180	3.22	3.180
<b>Supplementary information:</b> - No leakage, no venting, no short-circuit, no rupture, no explosion and no fire.				
6.4.4	TABLE: Test D: Shock (Fully discharged)			P
Batt. No.	Before test		After test	
	battery voltage (V)	battery weight (g)	battery voltage (V)	battery weight (g)
#11	2.84	3.180	2.84	3.180
#12	2.95	3.198	2.95	3.198
#13	2.71	3.169	2.71	3.169
#14	2.87	3.189	2.86	3.188
#15	2.91	3.167	2.91	3.166
#16	2.79	3.176	2.79	3.176
#17	2.93	3.178	2.93	3.178
#18	2.96	3.178	2.96	3.177
#19	2.95	3.166	2.94	3.165
#20	2.63	3.112	2.63	3.111
<b>Supplementary information:</b> - No leakage, no venting, no short-circuit, no rupture, no explosion and no fire.				

6.5.1	TABLE: Test E: External short-circuit (Undischarged)					P
Battery No.	Ambient, (°C)	OCV at start of test, (Vdc)	Resistance of circuit, (mΩ)	Maximum case temperature rise $\Delta T$ , (°C)	Results	
#1	54.7	3.15	79.3	69.4	P	
#2	54.7	3.13	77.5	70.3	P	
#3	54.7	3.08	76.8	69.1	P	
#4	54.7	3.07	75.8	69.8	P	
#5	54.7	3.24	80.6	69.3	P	
#6	54.7	3.23	83.2	69.4	P	
#7	54.7	3.19	76.2	70.0	P	
#8	54.7	3.05	77.3	66.7	P	
#9	54.7	3.28	75.5	73.1	P	
#10	54.7	3.22	74.4	71.1	P	
<b>Supplementary information:</b>						
- No excessive temperature rise (>170°C), no rupture, no explosion and no fire.						
6.5.1	TABLE: Test E: External short-circuit (Fully discharged)					P
Battery No.	Ambient, (°C)	OCV at start of test, (Vdc)	Resistance of circuit, (mΩ)	Maximum case temperature rise $\Delta T$ , (°C)	Results	
#11	54.4	2.84	80.3	57.1	P	
#12	54.4	2.95	81.3	58.3	P	
#13	54.4	2.71	83.8	57.1	P	
#14	54.4	2.86	86.6	57.4	P	
#15	54.4	2.91	79.8	57.9	P	
#16	54.4	2.79	78.6	57.5	P	
#17	54.4	2.93	77.5	58.5	P	
#18	54.4	2.96	79.5	58.2	P	
#19	54.4	2.94	78.5	58.9	P	
#20	54.4	2.63	80.4	57.4	P	
<b>Supplementary information:</b>						
- No excessive temperature rise (>170°C), no rupture, no explosion and no fire.						

6.5.2	TABLE: Test F: Impact (Undischarged)				N/A
Battery No.	Ambient, (°C)	OCV at start of test, (Vdc)	Maximum case temperature rise $\Delta T$ , (°C)	Results	
<b>Supplementary information:</b>					
- No excessive temperature rise (>170°C), no explosion and no fire.					
6.5.2	TABLE: Test F: Impact (Fully discharged)				N/A
Battery No.	Ambient, (°C)	OCV at start of test, (Vdc)	Maximum case temperature rise $\Delta T$ , (°C)	Results	
<b>Supplementary information:</b>					
- No excessive temperature rise (>170°C), no explosion and no fire.					

6.5.3	TABLE: Test G: Crush (Undischarged)				P
Battery No.	Ambient, (°C)	OCV at start of test, (Vdc)	Maximum case temperature rise $\Delta T$ , (°C)	Results	
#21	22.5	3.28	22.8	P	
#22	22.5	3.31	22.8	P	
#23	22.5	3.30	23.0	P	
#24	22.5	3.30	22.7	P	
#25	22.5	3.29	22.6	P	
<b>Supplementary information:</b>					
- No excessive temperature rise (>170°C), no explosion and no fire.					
6.5.3	TABLE: Test G: Crush (Fully discharged)				P
Battery No.	Ambient, (°C)	OCV at start of test, (Vdc)	Maximum case temperature rise $\Delta T$ , (°C)	Results	
#26	22.3	2.82	22.6	P	
#27	22.3	2.80	22.6	P	
#28	22.3	2.80	22.7	P	
#29	22.3	2.81	22.5	P	
#30	22.3	2.80	22.4	P	
<b>Supplementary information:</b>					
- No excessive temperature rise (>170°C), no explosion and no fire.					

6.5.4	TABLE: Test H: Forced discharge (Fully discharged)				P
Battery No.	OCV at start of test, (Vdc)	Max. discharge current, (A)	Test duration, (mins)	Results	
#31	2.88	0.01	1440	P	
#32	2.83	0.01	1440	P	
#33	2.88	0.01	1440	P	
#34	2.80	0.01	1440	P	
#35	2.75	0.01	1440	P	
#36	2.80	0.01	1440	P	
#37	2.84	0.01	1440	P	
#38	2.82	0.01	1440	P	
#39	2.83	0.01	1440	P	
#40	2.80	0.01	1440	P	
<b>Supplementary information:</b>					
- No explosion and no fire.					



6.5.5	TABLE: Test I: Abnormal charging (Undischarged)			P
Battery No.	OCV at start of test, (Vdc)	Max. charge current, (A)	Test duration, (Mins)	Results
#41	3.26	0.003	4000	P
#42	3.30	0.003	4000	P
#43	3.24	0.003	4000	P
#44	3.25	0.003	4000	P
#45	3.26	0.003	4000	P

**Remark:**  
**Supplementary information:**  
- No explosion and no fire.

6.5.6	TABLE: Test J: Free fall (Undischarged)		P
Battery No.	Before test	After test	Test results
	battery voltage (V)	battery voltage (V)	
#46	3.24	3.24	P
#47	3.21	3.21	P
#48	3.24	3.24	P
#49	3.24	3.24	P
#50	3.25	3.25	P

**Supplementary information:**  
- No venting, no explosion and no fire.

6.5.7	TABLE: Test K: Thermal abuse (Undischarged)		P
Battery No.	Before test	After test	Test results
	battery voltage (V)	battery voltage (V)	
#51	3.24	3.23	P
#52	3.24	3.18	P
#53	3.24	3.21	P
#54	3.28	3.19	P
#55	3.24	3.18	P

**Supplementary information:**  
- No explosion and no fire.

6.5.8		Test L: Incorrect installation (Undischarged)			N/A
Battery No.	OCV at start of test, (Vdc)	Resistance of circuit, (mΩ)	Maximum case temperature rise $\Delta T$ , (°C)	Results	
<b>Supplementary information:</b> Not CR17345, CR15H270 and similar type batteries of a spiral construction that could be installed incorrectly and charged.					

6.5.9		TABLE: Test M: Overdischarge (50% predischarged)				N/A
Batt. No.	Ambient, (°C)	OCV at start of test, (Vdc)	Resistance of circuit, (Ω)	Maximum case temperature rise $\Delta T$ , (°C)	Results	
<b>Supplementary information:</b> Not CR17345, CR15H270 and similar type batteries of a spiral construction that could be overdischarged.						
6.5.9		TABLE: Test M: Overdischarge (75% predischarged)				N/A
Batt. No.	Ambient, (°C)	OCV at start of test, (Vdc)	Resistance of circuit, (Ω)	Maximum case temperature rise $\Delta T$ , (°C)	Results	
<b>Supplementary information:</b> Not CR17345, CR15H270 and similar type batteries of a spiral construction that could be overdischarged.						

--End of Report--

Product: Lithium Manganese Battery

Type Designation: CR2032



Figure 1. Front view of package



Figure 2. Back view of package



Product: Lithium Manganese Battery

Type Designation: CR2032

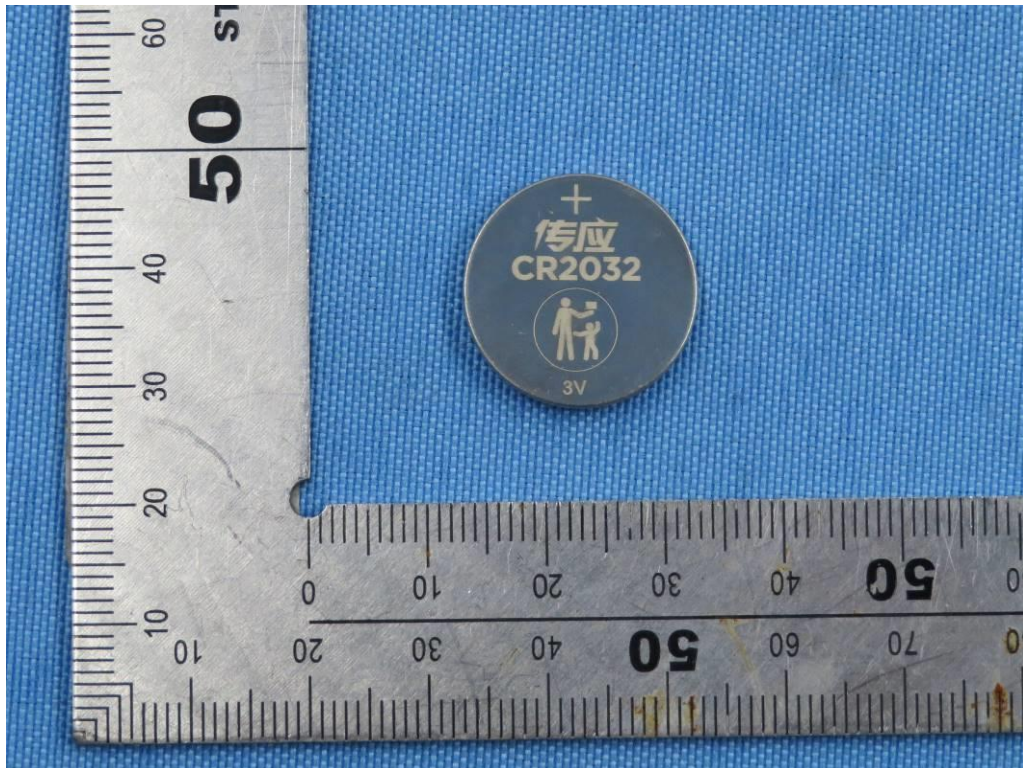


Figure 3. Top view of battery (with trademark 1)

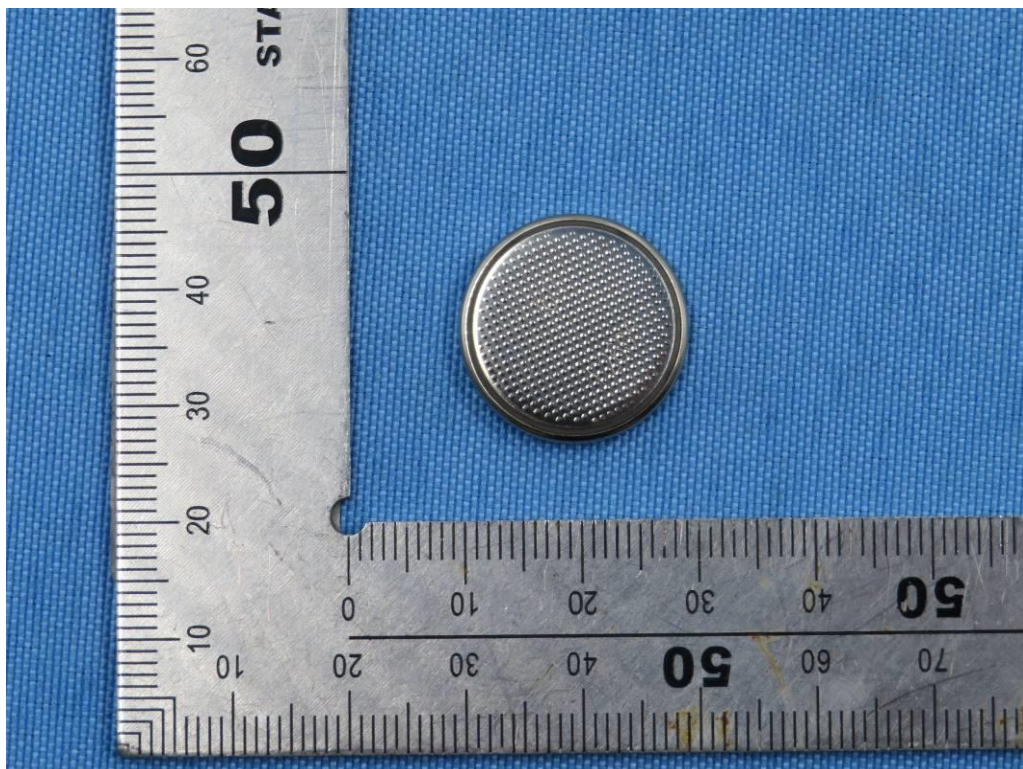


Figure 4. Bottom view of battery (with trademark 1)



Product: Lithium Manganese Battery

Type Designation: CR2032



Figure 5. Bottom view of battery (with trademark 2)

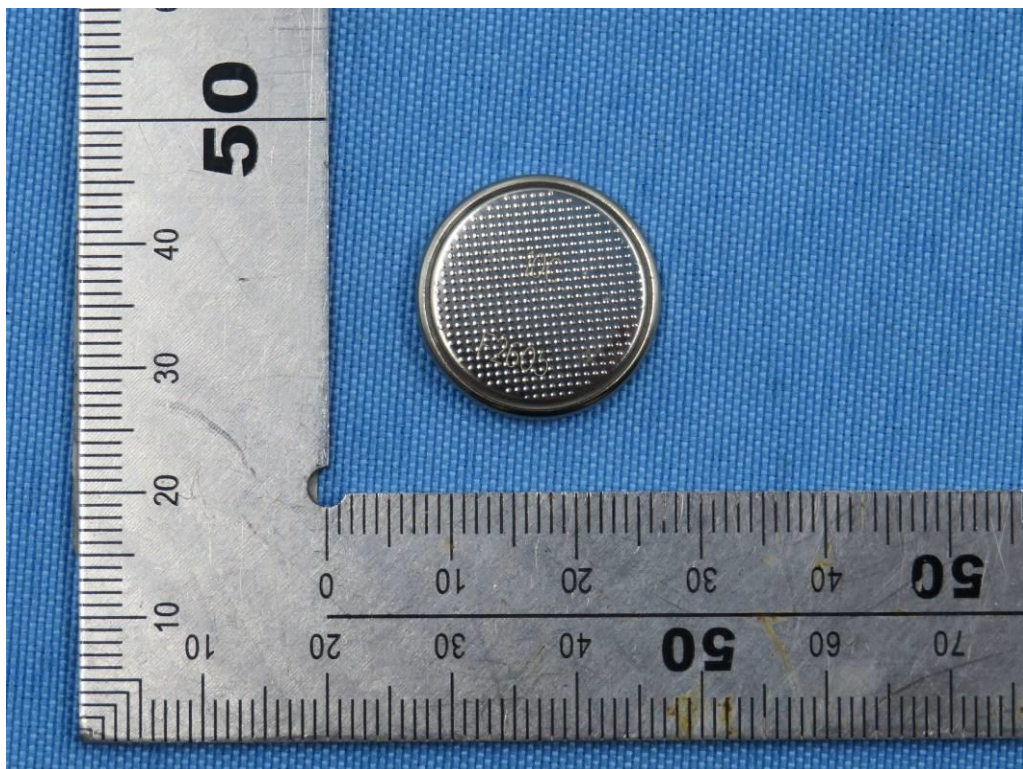


Figure 6. Bottom view of battery (with trademark 2)